The Surface Water Quality Monitoring Guidance Advisory Work Group Meeting
December 9, 2004

Meeting Summary

The fifth meeting of the Surface Water quality Monitoring Guidance Advisory Workgroup was held on Thursday, December 9, 2004 at the TCEQ campus. The focus of this meeting was to discuss the application of information provided by statistical methods to water quality listing and delisting decisions.

Applying Statistical Methods to Assessment Decisions

Although the mechanics of various statistical approaches and error rates have been reviewed in several previous meetings, stakeholders had not discussed how these rates should be applied in developing the assessment or the outcomes of requiring various levels of confidence to existing data.

The series of handouts illustrated a balance between Type 1 and Type 2 error rates for listing and delisting using the binomial method for various sample sizes and numbers of exceedances. Discussion focused on a proposal to list water bodies with fewer exceedances, in order to decrease the probability of missing an impairment, but as a result, increase the probability of listing a water body in error. These considerations were discussed in the context of the binomial method, but could be applied to other statistical methods, such as the Confidence Interval on a Percentile, when they are available.

Listing

Under the current procedures, listing controls the Type 1 error at 20% and does not consider the Type 2 error. To decrease the probability of missing an impaired water body without substantially increasing the probability of listing a water body that is not impaired, the proposal was made by staff to control the Type 1 error on listing at about 30% (rather than the current practice of 20%) and to recognize the Type 2 error at typical sample sizes.

Benefits of controlling the Type 1 error on listing at 30%:
- considers the statistically-described probability of a Type 2 error (i.e., not identifying and listing an impairment) and reduces this probability of error
- identifies water quality problems sooner than current methods
- identifies more water bodies as not supporting the standard, which will result in more standards reviews and should result in more appropriate standards
- is not more likely to list a water body than the method we used several years ago, before adopting the current binomial method

Disadvantages of controlling the Type 1 error at 30%:
- because more water bodies will be listed in error, proportionally more work will be done on the water bodies that are not actually impaired
- TCEQ will have to adapt to a longer list of impairments with currently limited resources
- there are permit restrictions for many listed water bodies and more water bodies will be incorrectly listed

- some resources will shift from routine monitoring, which characterizes water quality on all water bodies, to impairment verification monitoring

Some stakeholders are concerned about these disadvantages and do not support an approach that will list a larger proportion of the state's water bodies, especially when some of the current standards are inappropriate.

Delisting

Errors when delisting water bodies already identified as impaired (on the current 303(d) list) can also be described statistically. Error rates at delisting were discussed, that is controlling the chance of delisting an impaired water body in error at about 30%.

Benefits of controlling the Type 1 error (erroneously delisting) on delisting at 30%:
- the current practice of delisting a water body with one fewer exceedance than would keep it on the list is not a statistically-based decision; this proposal deliberately controls error rates at delisting
- fewer water bodies that are actually impaired will be delisted in error

Disadvantages of controlling the Type 1 error at 30%:
- it will be more difficult to delist water bodies, requiring more samples or more complete remediation
- resources will shift from routine monitoring, which characterizes water quality on all water bodies, to impairment verification monitoring

Some stakeholders are concerned about these disadvantages and do not support an approach that will make it more difficult to delist a water body.

Increasing Sample Size and Extending the Period of Record:
- the Type 2 error on listing and delisting can be reduced by increasing sample size
- to increase sample size, the period of record could be extended to more than the current 5 years of data until a requisite number of samples is reached
- for most parameters, a regimen of quarterly samples collected for five years results in 20 samples. If a few samples are missed, this period of record could be extended back until a minimum of 20 samples is available
- a minimum of ten samples could be required for parameters which require significant resources, such as 24-hour dissolved oxygen, ambient toxicity, toxic substances (metals and organics), and for the E. coli bacteria data which is only available for the last several years
- samples using more accurate methods or indicators may be used preferentially over older data.
- the most recent data may be used if the water quality is known to have improved or declined

Review of Assessment Data and Results:
- Stakeholders suggested that TCEQ make assessment results available to the river authorities and others that produce data used in the assessment, before a draft list is proposed in a public comment period. This would give local monitoring entities an opportunity to review the data used in the calculations for criteria attainment and contribute additional information about the instream conditions for particular sampling events or stations. Comment on the assessment outcome would be reserved for

the published draft.

Assessing Compliance With the Narrative Criterion for Color

Staff discussed the use of quantitative and qualitative information for determining compliance with the narrative criterion for instream color below waste discharges.

Assessing Ambient Toxicity

Staff reviewed and discussed clarifications for the draft document on assessing ambient toxicity, including those requested by stakeholders at the last meeting.

A New Category for the 303(d) List, Category 5d

A new subcategory 5d was proposed that will be useful for administrative purposes and to communicate TCEQ actions to address the impairment. This subcategory identifies water bodies that need to have the presumed water quality standards verified. Some stakeholders pointed out that this is similar to Category 5b, and for this category to be useful, the differences in water quality management response for 5d water bodies must be clearly drawn.

5d *For unclassified wadeable streams not meeting the presumed Aquatic Life Use or dissolved oxygen criteria, a determination of the appropriate standard will be made and nonattainment of these standards will be established before a TMDL will be scheduled*

For purposes of assessment, we determine aquatic life use (ALU) and DO criteria based on flow-type for wadeable streams that are not in Appendix A or D of the Texas Water Quality Standards. In general, perennial streams are assigned a High ALU, intermittent streams are assigned a Minimal ALU. As a first step, an appropriate assessment will be performed to determine if the ALU and criteria used for assessment are accurate. A path forward for these water bodes is to do a standards review, assign an ALU and criteria, then determine support status of the use and criteria. Then, staff will delist if the criteria are attained; if not attained, a TMDL or other remedial action will be scheduled.

Next Steps for the Stakeholder Workgroup

Stakeholders will have the opportunity to comment by email on a list of topics discussed by the workgroup and proposed changes to the methodology. After incorporating revisions that result from stakeholder email comment, TCEQ staff will present this list to TCEQ management, copying the stakeholders. A draft 2006 assessment methodology for public comment will be developed by TCEQ staff with direction from the Commissioners in early spring.

The meeting adjourned at about 2 pm. No additional meetings are planned.